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ORIGINAL ARTICLES.

ACCOMMODATION AFTER MIDDLE LIFE AND ITS PRACTICAL IMPORTANCE.*

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An "average" is a composite; a sort of type, like the so-called "typical case," used so extensively in the teaching of medicine. It is a help to the student who is endeavoring to get a general grasp of the subject; an outline of knowledge to which facts, noted subsequently, may be related. But too vivid consciousness of an "average" is a danger to the clinician. It has often been pointed out that in practice there are no "typical" cases, and the physician who can see only the "typical" features, will never be able to deal successfully with the individual patient.

I do not doubt but that every one of us has been helped to a definite conception of presbyopia by Donders' diagram (page 207, Accommodation and Refraction of the Eye)—the curve showing a gradual decline of accommodation from ten years to eighty. Yet we are brought very much nearer to the real facts by his other diagram (page 209) in which each individual case is represented by a circle or dot.

So seductive are averages, and so easy to remember, that we are always liable to approach the individual case with a bias against any departure from them; and no class of patients have suffered more on account of this bias than those requiring lenses

*Read before the Section of Ophthalmology of the British Medical Association at the Toronto meeting.

after fifty years of age. The presbyope has been too much abandoned to rule of thumb. His refraction difficulties are regarded as comparatively easy to correct. If something must be left to the uneducated optician the correction of presbyopia is thought to be his peculiar territory. If patients will come to the ophthalmologists for a difficulty of such minor importance, they are apt to be referred to the assistant, or to be disposed of after rather hasty and superficial study.

Such an attitude on the part of the profession is revealed by the fact that no class of patients come to me so frequently, unrelieved by men of good training and general carefulness, as presbyopes. Perhaps this is partly owing to a lack of appreciation of the value of minute exactness in refraction work. To the patient with 1 D. of accommodation, the error of 0.50 D. in his correcting lenses may mean more than 3 or 4 D. of uncorrected hyperopia in the child who has 10 D. of accommodation. Its practical importance, still overlooked, is the reason for bringing to your attention a subject that is far from new.

The basis of this paper is the refraction and accommodation in 559 patients in whom these were carefully measured by both skiascopy and the test lenses, among 750 unselected patients fifty years of age, and upward. The 559 cases have been chosen from the whole series because of possessing vision better than 4/8; from 4/6 partly to 4/3. Those in whom the impairment of vision was due to alterations of the crystalline lens might also be referred to for their bearing on the proportion, who at each ages have completely lost their power of accommodation. The main facts with regard to these cases are set forth in the following table.

The first column indicates the different ages of the patients; the second column the number for each year; the third the maximum power of accommodation encountered among these patients; the fourth the average of accommodative power for this age; the fifth the percentage of patients whose accommodative power has fallen to zero:

TABLE.

Age.	Number.	Maximum A.	Average A.	Percentage of A.=0
50	88	3.25	1.54	2
51	33	3.75	1.11	6
52	48	4.	1.38	2
53	41	2.75	1.21	5
54	35	2.50	.92	15
55	32	2.25	.83	13

Age.	Number.	Maximum A.	Average A.	Percentage of A.=0
56	38	2.50	.69	16
57	25	1.50	.67	16
58	15	1.25	.42	40
59	16	1.50	.62	18
60	23	1.	.34	46
61	9	0.75	.36	33
62	20	0.75	.16	60
63	14	0.50	.30	43
64	12	0.75	.42	25
65	12	1.50	.31	42
66	15	1.	.22	53
67	8	0.50	.06	87
68	12	0.50	.08	75
69	4	0.	.00	100
70	19	0.75	.13	63
71	3	0.	.00	100
72	9	1.	.11	83
73	1	0.	.00	100
74	2	0.	.00	100
75	4	0.	.00	100
76	3	0.	.00	100
77	1	0.	.00	100
78	4	0.50	.12	75
79	3	0.50	.16	66
80	2	0.	.00	100
81	0	0.	.00	100
82	2	0.50	.25	50

The column of maximum powers of accommodation show that this function may remain sufficient to be of practical importance up the age of four score. I cannot think that Donders' curves are quite correct. They would indicate an average of accommodative power of $\frac{3}{4}$ of a diopter at the age of 80, and no diminution after 70. My own cases possessing some accommodation at the age of 70 years and upwards run as follows:

- (a) Male aged 70 accommodation 0.50 D
- (b) " " 70 " 0.75 D
- (c) Female " 70 " 0.50 D
- (d) Male " 72 " 1. D
- (e) " " 79 " 0.50 D
- (f) Female " 80 " 0.50 D
- (g) " " 82 " 0.50 D

There is also room for skepticism as to some of the more striking cases reported as of unusual accommodation at a great age. For instance: Blok (*Annales D' Oculistique*, Dec., 1904, page 464), is said to have reported to the Ophthalmological Society of the Netherlands the case of a woman aged 62, who possessed 5 D. of accommodation, and of a man aged 72, who possessed 6.5 D. of accommodation. Details regarding these cases are not given. Such cases are so completely at variance from the usual experience, that it seems reasonable to regard them as errors, through ascribing to accommodation what was really due to something else. Every dilated pupil shows different states of refraction, simultaneously present in different parts of the pupil of the same eye. In most eyes it is only in one part of the pupil that the refraction is regular enough to give distinct vision. But in some, and they are not very rare among elderly people, two different parts of the pupil, having quite different states of refraction, are capable of giving almost equally good vision. Szily reported 14 such cases (*Klinische Monatsblätter fuer Augenheilkunde*, July, 1903); and Halben others in the same journal for November, 1904.

Something of this kind is quite common in conical cornea. It is also common in connection with the increased refraction of the nucleus that may occur in a senile lens. A patient may have, through the aid of his normal pupil, good distant vision; but with the pupil contracted with convergence, a myopia of 3 or 4 D., that enables him to read the finest type at 10 or 12 inches.

It seems fair to require that all cases published as examples of unusual accommodation in old people shall have had this condition of "double focus" excluded by careful skiascopic examination. It is also fair to require that the accommodation shall have been demonstrated objectively by skiascopy, as it was in the more striking of my cases. Of course the stenopaic effect of a small pupil must also be excluded, but that is less likely to be overlooked. 1 D. defect of refraction will reduce the vision $\frac{1}{2}$ in a 4 mm. pupil; and 3 D. will reduce it to $\frac{1}{4}$ of normal even when the pupil is contracted to 1.5 mm. in diameter. Of course the error due to testing distinctness of vision at the near point, with letters that can be read two or three times as far away, the perception of which represents only vision of $\frac{1}{2}$ or $\frac{1}{3}$, must also be excluded.

But the practical importance of accommodation after the age of fifty depends less upon the very unusual cases than upon

conditions that are rather common. We hear many stories of the people who never used glasses until some remarkably old age, and commonly explain them by the existence of a corresponding myopia, perhaps unrecognized. Some of these people, however, probably enjoy exceptional power of accommodation.

Mrs. D., with hyperopia of 0.50 D. to which was added 0.50 D. of hyperopic astigmatism, came to me after she was 51, never having used glasses. She had full 3.75 D. of accommodation.

Mr. D., who came to me at the age of 61, using only +1.50 D. for almost continuous newspaper work, and who, at 65, still has accommodation 0.75 D., told me he did not use, and did not need, glasses until he was 53.

Mrs. H. came to me at 60, wearing for near work her first glasses put on at the age of 50.

Of course in cases of that sort there is a possibility that refractive changes have partly balanced the loss of accommodation. Any patient who retains an appreciable amount of accommodation will prefer to use it rather than to have his range of distinct near vision unnecessarily shortened. The fear of too strong glasses rests partly on their mythical dangers, but partly on this real inconvenience.

Mrs. F., aged 65, had a hyperopia of 1.5 D. and was given +4.50 for near work. This was logical on the supposition that her accommodation was the average, .3 D., or that she had none worth measuring. But as she had 1.5 D. of accommodation she strongly resented such treatment, and +3.50 both served her better and satisfied her. The patient who has exceptional accommodation after the age of 50 will always appreciate the opportunity of being allowed to use it.

But the most important practical bearing of the presence of accommodation after middle life is in the false deductions as to the presence and degree of ametropia that may be based upon the failure to recognize it. It is really common to meet patients over 50 whose hyperopic astigmatism has been left uncorrected, and the consequent eyestrain unrelieved, because they had enough accommodation to prevent the hyperopia from being absolute.

Mr. T., aged 51, appeared to have no hyperopia and no accommodation, but he was unrelieved by his glasses. Atropine showed 1.5 of accommodation used up in rendering latent 1.5 D. of hyperopia.

It may rarely be necessary to use atropine to bring out the

full hyperopia at this age, but repeated testing, especially beginning with convex lenses that seem too strong, may be necessary to reveal the true ametropia.

Mr. F., aged 50, will one day accept only $+1.75$, giving $\frac{4}{3}$ mostly vision. But the next day he takes $+2.25$, getting vision equally good.

Mrs. P., aged 53, rejects everything above $+1$. D. at the first test, but next day accepts $+1.50$ D.

Mr. S., aged 50, takes one day $+1.25$ D. the next day $+2$.

Miss K., aged 52, at first refuses anything above $+1.50$; but a little later gets full vision with $+2.25$.

Even Mrs. D., aged 63, who at the first test showed only 3. D. of hyperopia and no accommodation, next day accepted $+3.50$, giving full vision, with 0.5 of accommodation.

A similar change was brought about in Mr. I., aged 67, who after a few minutes of "fogging" with a stronger glass, relaxed from 1.50 to 2. D. with his best vision of $\frac{4}{4}$ partly.

These fractions of a diopter may seem a small matter to the student of abstract science. But to the patient straining his weakened accommodation to the maximum, to keep the distinct vision that he feels is slipping away from him; and which he would certainly have lost if the deficiency to be made up had been greater; to such a patient they are of more importance than the whole theory of optics, or the greatest reputation that brother students of ophthalmic science can bestow upon us. Trifles make success; but success is no trifle. Then, too, the unrecognized inaccuracies of refraction work vitiate a very large proportion of the reasoning about it; and we will reach no clear understanding, or general agreement regarding it, until such inaccuracies are eliminated. Briefly I wish to recall the points:

That averages should be forgotten in prescribing lenses for an individual patient.

That the variations in accommodation after 50 are as wide between individuals of the same age, as between the averages for different ages.

That in some persons accommodation persists to extreme old age, and must be taken into account in the correction of presbyopia, or the determination of the ametropia present.

A CASE OF SYMPATHETIC INFLAMMATION.

By W. NOBBE, M. D.,*

ST. LOUIS, MO.

Mr. W., 42 years of age, a merchant, consulted me at my office for the first time on November 9th, 1904. He complained of an inflammation in the right eye of several days' duration. He stated that five days previously while he opened a case of goods, a nail flew off the box and struck against his right eye. He experienced no particular pain at time of the accident and soon after, and applied extract of witchhazel to remove the discoloration of the eyeball.

The examination of the eye revealed the following conditions: There was a hæmorrhage in the anterior chamber. The reaction of the pupil was very slow. There was slight chemosis of the conjunctiva bulbi and considerable circumcorneal injection. No wound or scar could be discovered on the bulbus and the patient felt certain that no foreign substance had entered the eye.

The tension was slightly increased. He could see movements of the hand at a distance of three feet. He now stated that immediately after the accident the vision in the right eye was considerably impaired, yet, having no pain at all he had continued his work for these five days.

I prescribed cold applications with liquor plumbi acetici and bandaged the eye.

On November 11th I saw the patient for the second time. The tension was now +1. Otherwise the conditions were the same. No pain. I prescribed instillations of 1 per cent pilocarpine solution.

On November 14th the tension was greatly increased. Vision was the same and projection normal, but he had frontal headache. The pilocarpine solution was now instilled five times during the day. I also ordered hot applications.

On November 21st the eye was very much irritated and tension high. Consultation with Dr. Alt.

On the next day I made an iridectomy in the upper outer quadrant. After this operation the tension became less, but the irritation of the eye remained even after the patient's discharge from the hospital on November 29th.

On account of this continued irritation of the eye and of the further diminution of vision to mere preception of light with uncertain projection, enucleation was proposed on December 10th.

*Read before the St. Louis Ophthalmological Society.

About a month previous to this date, on November 11th, Dr. Alt and I had made repeated trials with a large electromagnet without the least result, which of course did not preclude the possibility of the presence of a foreign body within the eye.

Enucleation was again strongly advised on December 15th, for fear of sympathetic inflammation of the left eye. Yet, in spite of a thorough explanation of the danger he was running, the patient refused his consent.

On Saturday, December 24th, patient came to my office at 10 a.m., complaining that the vision in his left eye was blurred and he had a slight headache. The left eye showed circumcorneal injection, the pupil was pearshaped and reacted but slowly. V=6/12+. Glasses did not improve it.

After a further consultation with Dr. Alt, the patient was immediately sent to the hospital. At 12 o'clock a posterior synechia had already formed, the aqueous humor was hazy and there were deposits on Descemet's membrane. The optic nerve and the retinal bloodvessels could still be seen without difficulty. There was no neuritis. At 12 o'clock I made in the left eye a subconjunctival injection of about three drops of a 1 pro mille solution of bichloride of mercury, and this was immediately followed by the enucleation of the right eye. After this a 1 per cent solution of sulphate of atropine was every hour instilled into the left eye and one drachm of mercurial ointment was used daily for inunction. The patient was kept in a dark room. In spite of the hourly instillation of atropine the pupil did not dilate.

On December 26th there were three posterior synechiæ and more deposits on Descemet's membrane, still the optic nerve could be seen. In the next few days, however, vision still further decreased until he could recognize movements of the hand at 4½ feet only.

On December 27th a consultation was had with Drs. Alt and Green. For the watery solution of atropine a solution in oil was now substituted and instilled every hour. The daily massage with one drachm of mercurial ointment was kept up, but omitted every fifth day, when a hot bath was given.

On January 2d, 1905, one posterior synechia had given way. Patient had frequent headaches. Projection was good. Optic nerve and retinal bloodvessels could not be seen, largely on account of the great density of the deposits on Descemet's membrane. On January 5th iodide of potassium 10 gr. to 200 was prescribed, one tablespoonful to be taken three times a day, after each meal.

January 7th, patient still in the dark room. The pupil slowly dilating. Atropine-cocaine solution instilled every 2 hours.

January 12th. The pupil is dilated more widely. Atropine-cocaine solution every 3 hours. Projection good, optic disc visible. Slight headache.

January 14th. Mydriasis good. All objects appear white to the patient. Instillation twice daily. Disc dimly visible.

January 15th, pupil slightly contracted. Optic disc and bloodvessels again invisible. Instillations of atropine-cocaine again ordered every two hours.

January 22d. Pupil wide. The optic nerve and blood vessels can dimly be seen. The patient sees movements of the hand. Mercurial ointment and potassium iodide internally are continued.

January 31. Atropine-cocaine solution instilled three times a day. The vitreous body has become somewhat clearer. Patient counts fingers without hesitation at about half a foot.

February 7th. The general condition of the patient is good. He counts fingers at from 2 to 4 feet. The optic nerve and the retinal bloodvessels can be distinguished, though still dimly. The patient is allowed to leave the hospital to go to his home.

Up to this time the patient had used nearly five ounces of mercurial ointment and taken daily forty-five grains of potassium iodide. He still sees everything in a whitish gray color. After his arrival at his home copious sweats were produced several times during the week by means of hot packs.

Gradually the vitreous body grew clearer. In the beginning of March a more rapid progress could be observed. Now pills containing gr. 1-16 of bichloride of mercury besides the iodide of potassium were given internally and the massage with the mercurial ointment was discontinued.

On March 11 the patient could discern the framework of the windows in his room. There was no great difficulty now in seeing the optic nerve, but the retinal bloodvessels were but dimly recognizable.

On March 31st, the patient was allowed to take a walk in the open air for about five minutes.

May 3rd. The patient can now count fingers at a distance of 14 feet. Externally the eye shows no more symptoms of inflammation. The atropine-cocaine solution is instilled once a day. There are still numerous precipitates on Descemet's membrane. Hot applications to the eye. Patient suffers no longer from headache.

On May 15th the mercurial pills were discontinued. The patient went to his office for about two hours daily. $V=6/36$ with $+0.75$ D. $\odot +1$ D. cyl. ax. 90° . The instillations of atropine were continued until June 26th, when he had $V=6/9$ with $+0.75$ D. $\odot +0.75$ D. cyl. ax. 90° .

I saw the patient the last time on December 22d, 1906. V was then $=6/6$ with $+0.75$ D. cyl. ax. 90° , and Jaeger II with $+0.75$ D. $\odot +0.75$ D. cyl. ax. 90° . He wears no artificial eye.

In the enucleated eye I found lying externally to the optic nerve and embedded in a thick mass of exudation, a minute fragment of steel. It had a barbed point and was so firmly driven into the tissue that all efforts to remove it by means of the magnet proved ineffectual. Undoubtedly the mass of fibropurulent exudation which surrounded it proved to be a further obstacle to these efforts.

It is well known that it is still a very much debated and debatable question, which of the theories advanced to explain the production of sympathetic disease rests on the soundest basis, the migration theory, or the ciliary nerve theory, or the toxine theory.

The adversaries of the migration theory hold that sympathetic irritation and sympathetic inflammation are two entirely different entities. They claim that the sympathetic irritation is not a lighter form of or a prodromal stage of the sympathetic inflammation, since sympathetic inflammation never develops from a sympathetic irritation. Furthermore, they say that in many cases of sympathetic inflammation an irritation is lacking.

It may be said against these statements that a sympathetic inflammation not infrequently develops slowly from the symptoms of a sympathetic irritation and that the former is simply an intensification of the latter. Praun rightly contends that the sympathetic neuroretinitis which is a somewhat rare manifestation of sympathetic inflammation and which according to the migration theory, should be the most frequent one, and which looks like an inflammation and not like an irritation, in its clinical aspect always presents only the signs of a sympathetic irritation. This is proven by the fact that a sympathetic neuroretinitis usually disappears within a few days.

At all events the migration theory has lost ground in several respects. The most important fact going against it seems to be that even after resection of a small part of the optic nerve sympathetic inflammation of the fellow-eye has been observed.

Such an observation was certainly very apt to strengthen the ciliary nerve theory. Schmidt-Rimpler asserts that the irritation of the ciliary nerves in the injured eye by reflex action produces a faulty condition in the circulation and nutrition, and that this alone is the cause of the sympathetic inflammation of the fellow-eye.

In the case just reported, haziness, photophobia, lacrimation and slight headache, the usual symptoms of irritation, were present for about 18 hours, but the symptoms of inflammation developed very quickly. The time elapsed between the day on which the injury occurred and the appearance of the sympathetic inflammation was 49 days.

The shortest period in which a clearly defined sympathetic inflammation has been observed, as proven by many data, is three weeks. It may, however, be claimed with some degree of certainty that generally it takes from 4 to 8 weeks to evolve a true sympathetic inflammation. To exactly state the longest interval possible and observed is rather more difficult. According to Schirmer an iridocyclitis in the injured eye usually precedes the sympathetic inflammation in the fellow-eye. Since such an iridocyclitis may make its appearance at any time, a sympathetic inflammation may, also, develop at any time during the life of such a patient.

The case which I have here detailed was one of *iridocyclitis serosa anterior sympathetica*. Circumcorneal injection, lacrimation, photophobia and haziness appeared in the beginning of the sympathetic affection almost at once with fine deposits on Descemet's membrane and posterior synechiæ. This form usually develops into a plastic iridocyclitis. Such an outcome did fortunately not occur in this patient.

This case is more particularly remarkable in this that after the enucleation of the injured eye the vision of the sympathetically affected fellow-eye continued to decrease, but that notwithstanding the severity of the symptoms the patient made a complete recovery and has now normal vision.

Nettleship, von Arlt and Fuchs recommend an early iridectomy on the injured eye. Praun, also, obtained good results by this procedure in four of his cases. He thinks such good results are due to an improvement in the circulation in the injured eye.

An injection of 3 drops of a 1:500 solution of bichloride of mercury once a week was advised by Abadie. I venture to say that in my case the subconjunctival injection of a strong solution

of bichloride of mercury, combined with the energetic massage with mercurial ointment, the dark room and potassium iodide, contributed largely to the final good result.

Schenkel, Bach, Jäcobi and others mention that, perhaps on account of trophic changes, the eyebrows on the side of the injured eye became discolored. This did not happen in my case.

I here want to draw attention to Praun's statement, that nowhere in literature can any mention be found of the analogy existing between post-diphtheritic paralysis and the origin of sympathetic inflammation. As sometimes after diphtheria, we observe in some cases of iridocyclitis that some time after the disappearance of the septic process pathological changes make their appearance in the course of peripheral nerves, quite distant from the original focus of inflammation.

In the post-diphtheritic paralysis such pathological changes involve the motor and sensory nerves, while in cases of sympathetic inflammation the vasomotor nerves of the fellow-eye become affected. The fact that the time of incubation lasts several weeks, seems to prove that sympathetic inflammation is produced by the influence of toxins. It simply takes this period of time for the toxins to effect the changes in the tissues.

CORRESPONDENCE.

To the Members of the American Medical Association:

While much has been written and many laws have been passed having as their object the protection of the eyes of new-born children, an appalling amount of blindness results each year from the neglect of preventive or curative measures in ophthalmia neonatorum.

It is a serious criticism upon our efficiency and our position as a scientific body that a disease whose prevention and effective treatment are so well understood should be allowed to cause such widespread disaster.

It would seem that the time has come when ophthalmia neonatorum should be completely and permanently stamped out as a cause of infantile blindness. This can be accomplished, however, only by the concurrent action of the whole medical profession throughout the country.

In recognition of this fact the following resolutions were adopted at the last meeting of the American Medical Association:

WHEREAS, Notwithstanding the long-continued efforts of the medical profession to make generally known the infectious character of ophthalmia neonatorum and its danger to sight, the ranks of the blind are still largely increased annually by those who have unnecessarily lost their vision as a result of this disease; and

WHEREAS, We possess in the silver salts an almost absolute specific for its prevention and treatment, therefore, be it

Resolved, That this Section recommends that a committee consisting of at least one ophthalmologist, one obstetrician, and one sanitarian, with invited co-operation of a sub-committee, consisting of the president and secretary of each state society, be appointed by the President of the Association to formulate and make effective the details of a plan that may give uniform legislation and definite instruction to the profession and laity concerning the prevention and treatment of this disease.

Resolved, That this Section recommend an ophthalmologist for such committee to be appointed by the incoming Chairman and Executive Committee.

In fulfilling the direction of the Association, the Committee desires to present the following program, and it is earnestly requested that expressions of approval or of criticism be freely submitted for its guidance so that the recommendations of the Committee shall be in effect those of the entire profession.

While it is true that merely washing out the lids of the new-born child with distilled water lessens largely the number of cases

of ophthalmia neonatorum, the difficulty of this procedure in inexperienced hands, and the probability of cocci remaining in the eyes of the child, make essential the employment of some germicide; and by almost universal agreement one of the salts of silver is recognized as the most nearly specific.

1. As experienced pharmacists give the assurance that a solution of nitrate of silver, when hermetically sealed in light-proof receptacles will keep indefinitely, and as physicians are generally agreed that this is the most effective silver salt for the prevention of ophthalmia neonatorum as well as the most inexpensive, the choice of the Committee would seem to be limited to this as the special germicide to be recommended.

Does this meet with your approval?

2. As the classical 2 per cent. of Cr  d   occasionally causes silver catarrh and 1 per cent. rarely does so, and since as a preventive measure it must be used largely by students, midwives and other inexperienced persons, would it not be safer and better to select the 1 per cent. solution as the strength of nitrate of silver to be recommended?

In this connection the following statements from an address delivered by R. Brudenell Carter, at London, in 1902, are pertinent:

"There can be no possible reason why the instructed midwives whom we are hoping to obtain in the near future should not universally adopt this (Cr  d  's) preventive treatment, and thus place the children of their patients beyond the reach of danger. The application ordered by Prof. Cr  d   appears to me to be unnecessarily strong. For curative purposes I have always found a solution of one part in 240, or of two grains instead of ten to the fluid ounce of water, to be perfectly satisfactory; and I have no doubt that it would be equally so as a prophylactic."

Do you recommend a 1 per cent. solution of nitrate of silver as a prophylactic in all cases?

3. As the failure of use of silver salt as a routine part of every new-born child's toilet is largely due to the fact that the preparation is not at hand when required, should not this be met by the enactment of a law in each state securing the distribution through the various State Health Boards of small, sealed, inexpensive, light-proof, tubes or ampoules of the selected solution to be sent gratuitously to every physician and midwife on the passage of the law and subsequently when required or on filing of each birth certificate?

Do you approve of this?

4. In order that this solution, which shall be freely supplied, may be always used it shall be required that the birth certificate shall contain a statement signed by the accoucheur that some recognized procedure specified on the blank has been used in

each eye of the new-born child on the day of birth as a preventive of ophthalmia neonatorum; in the absence of this statement should ophthalmia neonatorum develop and the child lose the sight of one or both eyes the accoucheur, whether physician or midwife, filing the certificate, shall be deemed guilty of criminal negligence and shall be subject to such penalty as the state may exact.

Does this meet with your approval?

5. It shall be the duty of the State Health Officer to place ophthalmia neonatorum on the list of communicable diseases, and failure of the attendant to report to the local Health Board each birth, the existence of ophthalmia neonatorum when present, and the fact that some prophylactic measure has or has not been used, shall be considered a misdemeanor and subject the offender to such penalty as the state may exact.

Do you approve of this?

6. It is strongly urged if the above program meets with general approval that the president of each state association be invited to appoint a Committee on Ophthalmia Neonatorum whose duty it will be to collaborate with the State Board of Health in securing in the several states the enactment and enforcement of laws embodying the above propositions.

Do you approve of this?

The Committee will feel grateful for a categorical reply to each of these questions and such further suggestions or comments as you may wish to make concerning this important subject.

Signatures of Committee:

F. PARK LEWIS, *Chairman.*

J. CLIFTON EDGAR.

F. F. WESBROOK.

MEDICAL SOCIETIES.

A DISCUSSION ON SYMPATHETIC OPHTHALMIA,
Held at the 74th Annual Meeting of the British Medical Association,
at Toronto, Canada.

Opening Papers.

I.—G. H. BURNHAM, M.D.,
TORONTO.

The terms "sympathetic irritation" and "sympathetic inflammation" are applied to an affection in which one eye is implicated as the result of disease or injury to the other.

It is held by many, perhaps the majority, that these are two essentially different conditions. For my part, I do not agree with this view, and, on the contrary, think that they are the same as to origin. Traumatisms probably cause over 80 per cent. of these cases of sympathetic inflammation. These injuries receive their serious import, as a rule, according to the absence or presence of interference with the ciliary region, aptly termed by Nettleship "dangerous zone."

There may also be added as causes ossification and calcification of the choroid and ciliary body, and also pressure of an artificial eye or incarceration of the stump of the optic nerve in scar tissue after the operation of enucleation.

A premonition of trouble, especially if sympathetic irritation is passing into sympathetic inflammation, is, according to Marcus Gunn, the oscillation of the iris.

With or without warning sympathetic inflammation shows itself as an irido-cyclitis—plastic in character; as a serous iritis, which may pass into plastic irido-cyclitis; as a choroido-retinitis, in which the outlines of the papilla are hazy, the retina oedematous, with or without the appearance of slight serous iritis. This is a rare form.

The symptoms in the sympathizing eye may be acute or chronic. The exciting eye may show marked inflammatory symptoms or may be very quiet. The period of incubation, or that period of time which intervenes between the reception of the injury in the exciting eye and the development of inflammation in the sympathizing eye, varies from three to six weeks.

The extremes of the onset of the disease are, it is said, from two weeks to sixty years. I have seen a case arising after an interval of fifty-five years.

Sympathetic irritation may arise in the first forty-eight hours, but it is exceptional. It was almost universally believed at one time that this was due to a reflex action through the ciliary nerves, and hence the term "sympathetic" was applied.

The exact nature of this dreaded disease is not yet known. The theory of infection is now largely held. That is, that according to Deutschmann, the inflammation is a progressive process in the continuity of the tissue of one eye to the other by way of the optic nerve apparatus and is bacterial in origin. Hence the term "migratory ophthalmia."

Also there is the ciliary nerve theory: that is, that disturbances of nutrition and in the circulation caused by irritation of the ciliary nerves in the injured eye create the inflammation in the eye sympathetically inflamed.

That the whole question is still in a state of doubt is allowed even by those who are strongly in favour of one or the other theory.

It is stated that the most important consideration is the management of the injured eye. This division of the subject, weighty as it is, I shall not dwell upon. Nor shall I refer to the operations upon the exciting eye, namely, enucleation or one of its substitutes.

That which especially interests me is the treatment of the eye sympathetically inflamed. Also, I shall say a few words regarding the transmission of the disease from one eye to the other.

It seems to me that, though an injured eye may remain for a variable length of time after the injury without exciting any apparent sympathetic irritation or inflammation, and then this disease—sympathetic inflammation—appears, we have during this stage of quiescence a comparatively benign condition, in which slow pathological changes begin, and become very active and destructive later on.

By using the combined treatment during this stage of quiescence, it suggests itself that the acute and malignant stage could be avoided. That is, that the onset of sympathetic inflammation could be prevented by this constitutional treatment of the exciting—the injured—eye. Of course there are limitations arising from the seriousness of the wound, but otherwise the idea strongly commends itself to me.

In one of the cases of sympathetic inflammation reported by me,* the penetrating wound extended through the cornea from its centre down to the edge of the ciliary processes without apparently injuring them. I removed a portion of the iris so as to free the wound, and hence could plainly see the parts. For two months I watched it and could see no change. Everything was quite quiet. The sympathetic inflammation apparently developed itself rapidly—that is, in about twenty-four hours or so. Now, when I looked, I found that the point of contact of the wound with the ciliary processes, which previously was quite quiet, had become covered with a small fuzzy-looking exudate, noticed for the first time.

It is difficult to believe that the beginning of this sympathetic inflammation was coincident with this altered condition of the wound, nor do I believe it; but I regard it as the result of a pathological process in the injured eye which is variable as to its power for evil. However, after the removal of the eye, all the symptoms of this disease seemed to be in complete abeyance, only to reappear in a few days with great violence.

This goes to show that the process in the wound, which is followed by the sympathetic inflammation, is the origin. Hence there was this rapid temporary amelioration after the withdrawal of the cause by the removal of the eye, but it was not permanent, as the pathological process had now so far passed beyond its benign state as to render any other result an impossibility. Hence the long-drawn out presence of sympathetic irritation, in that the unhealthy or pathological process in the wound may remain limited to this form, which may exist from a few days to several years, and the rapid change into sympathetic inflammation, or the presence of the latter almost from the beginning.

I deeply regret that, owing to a misadventure, the excised eye was lost, as otherwise a careful examination would have been made.

The successful treatment by the combined method of the severest forms of irido-cyclitis, arising from different causes, has enabled me to compare their respective virulency. The malignant character of acute sympathetic irido-cyclitis has particularly impressed me.

Again, is it not puzzling that sympathetic ophthalmia should so widely vary in its manifestations, namely, an irritation and nothing more; a slight punctate keratitis, which quickly passes

*The Combined Treatment of Diseases of the Eye. London, H. K. Lewis.

away; a serous irido-cyclitis, painless, relapsing, and gradually becoming quiet, with damaged vision; and an irido-cyclitis of a most severe character; and we, though carefully examining the exciting eye, can so seldom forecast correctly the type that will ensue, and are sometimes astonished at its non-appearance?

I believe that the cause of sympathetic irritation and inflammation in all cases selects two routes to travel by—namely, the ciliary nerves and the optic nerve—and that in every case of sympathetic trouble these two routes are always made use of, but, of course, in varying degrees.

In cases of pure sympathetic irritation the removal of the injured eye is accompanied by a cessation of the condition, immediate and final, as the condition in the sympathizing eye is functional, not structural, and the pathological process in the injured eye, being as yet limited, is followed, after its removal, by a cure.

As to the other variety, operative and constitutional treatment, as usually followed out, is so rarely crowned with success as to justify the use of the phrase that the exception proves the truth of the rule, that even partial recovery is rare indeed.

The character of the impulse sent from the injured eye, which is something very difficult to define, is the cause of the various phenomena of the sympathetic trouble.

If I did try to define it, I should say that it was a hyperactivity of the physiological circulation of the part or parts injured, of an unhealthy character, that caused the mischief. If we can offset this by exciting physiological hyperactivity of a healthy character, the morbid process in the sympathetically inflamed eye can be stopped, and the tissue, even if much affected, restored to a state of practically normal functional power.

In the case of sympathetic ophthalmia already referred to, as long as I could get a view of the optic disc and fundus, till it was shut out by the exudate into the anterior part of the eye, there was no apparent change. And when later on, owing to the process of recovery established, I did get a view, there was seen a condition which showed that in the meantime the optic nerve had become inflamed after a fashion, which abruptly limited to the disc the dense, putty-like exudate which completely covered it and hid from view the vessels, leaving the fundus unaffected save for a few spots of choroido-retinitis in its outer part close to the ciliary processes.

When the combined treatment has so favorably demonstrated its ability to bring about so satisfactory a curative process in

the greatly diseased tissues of sympathetic inflammation, I am driven to the conclusion that its success is due to its peculiar quality of being able to overcome hyperactive physiological circulation of an unhealthy kind by exciting hyperactive physiological circulation of a healthy kind. Moreover, this power which I ascribe to it is of such a character as apparently never to exercise a baneful influence, at least as far as the eye is concerned. Nature, however, being always keenly on the alert to arrest any process of unhealthy change in the body, responds to any treatment which can arouse the physiological activities to greatly-increased healthy exertion.

A medicine may at the same time influence the physiological circulation in some tissues for good and in others for evil. The combined treatment, however, in my hands has not as yet shown any influence save a good one. With your permission, I shall endeavor further to elucidate by examples the meaning of the above remarks.

Take one example of a lethargic infiltration of the cornea. Let it be treated solely by the dropping into the eye of a solution of eserine. In this case, just prior to the use of the drops, a few blood vessels can be seen upon the corneal surface close to the margin. The local use of these drops causes greatly-increased rapidity in the growth and number of these vessels, and the healing process is accelerated. Then again its use, though so satisfactory in regard to the corneal disease, can give rise to an iritis in the same eye at the same time. Thus the physiological hyperactivity aroused by this medicine concerning the cornea was quite healthy in its effects; but a contrary, that is an unhealthy effect regarding the iris tissue showed itself in that an iritis not present at the beginning became evident.

That this unhealthy action upon the iris sometimes may excite an irritation and nothing more is granted; at others an inflammation more or less decided, according to the strength and duration of the presence of the cause; in this case, the eserine is also assented to. We also know that in eyes similarly affected their susceptibility to the unhealthy action of eserine greatly varies; that is, that one eye will endure a certain strength of the solution with very slight ill effects which in another will cause iritis or, as I term it, unhealthy action; therefore, this remedy has to be used with caution.

Now the use of the combined treatment shows no such effect. It will arouse the activity of the physiological circulation of the

cornea to a much higher degree than eserine or any other remedy, as evidenced by its many and uniform successes, but at the same time will not act injuriously upon the iris and other tissues of the eye. Thus the hyperactivity engendered by the combined treatment is ever healthy, never unhealthy, and hence its widespread influence for good. Therefore, the manner and completeness or thoroughness with which the physiological hyperactivity is called into action has apparently a great deal to do with the effect produced, whether it be good or evil, and each of these latter may vary in degree.

This I consider in the light of a fact which has much to do with the explanation of the origin of sympathetic ophthalmia; for a pathological process is subject to the same laws, in its way, as a healthy one, and hence by analogy may it not aid us in the unravelling of the pathological condition now involved?

By the use of the eserine the hyperactivity excited is local and partial, and apparently chiefly limited to the blood vessels; whereas, by the use of the combined treatment the whole nervous system is affected, and thus the circulation of every kind in the eye is increased. This is what I call the physiological circulation of a part or organ.

Thus the treatment of sympathetic ophthalmia, in its many varieties, by the combined treatment has been successful in overpowering the unhealthy process. This latter is the offspring of a cause limited in effect to the eyes, and hence relatively a weaker pathological or unhealthy condition than the healthy and curative condition set up by the combined treatment, in that this latter is, so to speak, backed up by the whole nervous system.

Any cause which disturbs the whole nervous system is exceedingly powerful for good or evil, and allowed to be still much more powerful than a cause which influences it only partially. The so-called spontaneous cure of any disease is due to this heightened physiological activity overcoming the diseased condition. To be able to call this heightened healthy activity into operation is consequently to be able to overcome the disease. It is apparently the possession of this power by the combined treatment which has enabled me successfully to treat sympathetic inflammation, and also severe cases of hypopyon kerato-iridocyclitis. These are merely mentioned as examples, which I think, do convincingly exhibit its power.

In one of my cases of sympathetic inflammation, the combined treatment not only stopped the progress of the disease but also removed the dense exudate, giving normal vision.

In another case, it is true, the sympathetic inflammation, which had been present for some time previous to the use of the combined treatment, was stopped; but the exudate being of such long standing could not be, at least was not, as fully removed as in the first-mentioned case, and besides, the lens had become cataractous. The removal of the lens, and a subsequent iridotomy with de Weker's scissors, gave excellent vision.

In conclusion, I beg to say that I am beginning to think that, with a wound in the ciliary region of such a character that it is advisable to enucleate the eye through the fear of sympathetic ophthalmia alone and not on account of the injury *per se*, I shall keep in the eye and use the combined treatment. By doing this I expect to accomplish two things—namely, to retain an eye which should otherwise be removed, and to prevent the development of sympathetic inflammation. This seems to me to be a course which is feasible and justifiable after carefully considering the results obtained from the use of the combined treatment.

THE PREVENTIVE TREATMENT OF SYMPATHETIC OPHTHALMIA.

II—ARNOLD LAWSON, F.R.C.S.,

Assistant Surgeon, Royal London Ophthalmic Hospital.

In the following remarks I intend to confine myself entirely to the practical side of the disease, and particularly to the preventative treatment. What I think is most needed are more authoritative lines upon which a surgeon can base his decision upon the propriety of attempting to save a dangerously wounded eye, and which will guide him through the dangers and difficulties which may follow the attempt.

Broadly speaking, there is no difficulty in a large number of cases of perforating wound of the globe, because the character of the wound and the extent of the injury have utterly destroyed all chances of saving the eye as a visual organ; and it is only in a few instances of this sort that cosmetic reasons would, in the slightest degree, justify a surgeon in running any risk of sympathetic ophthalmia by attempting to save the eye.

But there remains a large number of cases which present considerable difficulty, and which must cause great anxiety.

This class includes cases of perforating wounds of the sclerotic, which are of a kind generally recognized as dangerous wounds, that is, in which the ciliary body has been lacerated but in which some sight is retained. It also includes wounds where a foreign body is lodged in the globe and cannot be extricated, but vision is not destroyed. Wounds caused by an instrument known to be septic, or those of a particularly lacerating character must always be sources of great anxiety when some vision is retained, and so one might elaborate a category of doubtful injuries where the surgeon, anxious to do his utmost for the patient, is face to face with a problem upon the right solution of which may depend not only the retention of a useful eye, but the preservation of the sight in the uninjured one.

It may be urged that a surgeon should accept no responsibility of this sort. If he encounters an injury from which there arises any question as to its likelihood to produce sympathetic ophthalmia, he should decline to take any risk, and should advise and carry out enucleation.

On the other hand, it may be urged that in many such cases the probabilities of sympathetic ophthalmia supervening are very small, and if it should arise by mischance, that in any case, the advent of the disease does not necessarily nowadays spell blindness. In other cases, too, the danger, though obviously present, may be much minimised by the right treatment of the wound, and especially when the other eye, for some reason or other, has defective sight, an attempt to save the injured eye may appear imperative and be held to justify the risk.

With regard to the first line of argument—that a surgeon should in no case accept responsibility and should advise enucleation in all and every doubtful case—I think that most surgeons will agree that such an attitude is unjustifiable, although in the present uncertain condition of our knowledge it may be condoned. It is in its power as a preserving agent that the chief glory of surgery lies, and relief by destruction of an injured organ or limb is being more and more relegated to the history of the past. The attention of a good surgeon must necessarily be turned first to the possibility of saving an injured eye, and all the various conditions of the case tending to effect such a result must be carefully considered before the thought of sacrificing the eye should cross the mind. The practical point is that up to the present time there have been but very insufficient and imperfect indications laid down by means of which a surgeon may be guided

in his treatment of one of those most difficult cases of which a few examples have already been mentioned, and, as a consequence, the line of treatment adopted in any case is largely guided by the personal experience of the surgeon himself. This may in the hands of competent, experienced surgeons, be a perfectly satisfactory solution, and probably no experienced surgeon having made up his mind on the propriety of removing an injured eye would yield his opinion on this point to any one. Nevertheless, there are many more surgeons who lack such experience, and to whom a more definite exposition of the pros and cons, the dangers and possibilities, the risks that should be taken and the risks that should be shirked, would be a great boon.

I have therefore endeavored to summarize the whole matter in the form of five questions. It is not possible in our present state of knowledge to give a solution which may be considered completely satisfactory to any of them, but I venture to think that if from these questions could be drafted, so to speak, some plan of campaign with which a surgeon might be prepared when confronted with a difficult case of perforating wound of the globe, much good would result.

I will endeavor to answer these questions from what must necessarily be my own points of view. Personally, I am of opinion that a small committee to inquire into and draw up a few general rules on the lines I am suggesting would prove of general interest, and that a report of this kind would be very generally welcomed by ophthalmologists throughout the world.

1. *Can it be definitely stated of any wound of the globe that it will inevitably produce sympathetic ophthalmia in the other eye?*

My answer to this would unquestionably be in the negative. One has, in the course of ordinary hospital practice, seen so many shriveled stumps, which are the result of terrible lacerations in bygone years, and which have not in the past and do not in the present cause any inconvenience, that one is inevitably led to the conclusion that sympathetic ophthalmia is an accident to be dreaded and not a certainty to be foretold.

2. *If not, what are the lines upon which a surgeon should decide upon immediate removal of the globe?*

The complete destruction of the globe as a visual organ must necessarily simplify matters, and this would be an answer in some instances.

Secondly, the presence of suppuration in or about the wound

would render the possibility of saving the eye remote, and would lead the surgeon to sacrifice the eye with little compunction.

Thirdly, the presence of a foreign body impacted in the globe, which cannot be removed, and about the asepticity of which grave doubts are entertained.

Fourthly, extensive and lacerated wounds of the ciliary body, accompanied by prolapse and leakage of the vitreous especially if not seen within twenty-four hours of the injury, and especially also in cases where the other eye is healthy and visually good.

3. *What are the considerations which may decide him to attempt to save the eye?*

In the last three examples given of cases where the surgeon would advise immediate enucleation some sight may be still retained when the patient comes under observation for the first time. In such cases, if the other eye is unsound or visually defective, it may be advisable to attempt to save the injured eye, provided:

(a) That the wound is seen immediately or very shortly after the injury.

(b) That the wound shows reasonable probability of being amenable to aseptic surgical measures, and that it can be satisfactorily closed without any entanglement of the ciliary body or vitreous.

(c) That, when a foreign body is impacted in the globe and is incapable of extraction without the complete, or almost complete, certainty of destroying the eye, such a body is known to be aseptic. This, for instance, would probably be the case in a wound caused by the lodgement of a game shot.

Further, any recent, cleanly-cut wound of the globe, if not of too extensive a character, and especially if not accompanied by prolapse of the uvea, or trespassing freely on the ciliary body, or accompanied by other injury which renders recovery of sight highly remote, should be cleansed and closed by aseptic sutures, and such wounds usually do very well and give rise to no complications. I may here remark that the sutures closing such a wound should be applied by using double-needled threads, which should be passed from within outwards, taking care to pass the needle through the sclera only, whilst an assistant smooths away the uvea round the wound with a spatula. By employing this method all pressure on the globe which would probably squeeze out vitreous is avoided; and, moreover, the inclusion of the uvea in the sutures, which is obviously undesirable, is the more easily prevented.

4. *In the later history of a case, short of definite evidence of commencing sympathetic ophthalmia, what symptoms, if any, should decide the surgeon in advising enucleation?*

This is a difficult question to answer. First, when an injured eye will not quiet down after prolonged treatment by all possible or available surgical methods, and is the subject of continued irido-cyclitis, with or without the addition of glaucomatous tension, the danger of the supervention of sympathetic ophthalmia becomes a steadily increasing one.

Secondly, in other cases the injured eye may apparently become more or less quiescent, but the other eye continues very irritable, exhibiting great lacrimation and photophobia. Sympathetic irritation, as this train of symptoms is styled, is now understood to be simply the expression of a reflex neurosis, and does not necessarily portend the advent of sympathetic ophthalmia. Nevertheless, one cannot but regard the long continuance of sympathetic irritation as a bad omen, and a symptom to cause some anxiety. It should, in my opinion, evoke a reconsideration of the propriety of enucleation in a doubtful case, and will justify the surgeon if he counsels this step.

Thirdly, in hospital practice, and more rarely in private practice, the question of the time that convalescence must occupy becomes one of great importance to the patient. A tedious, prolonged course of treatment extending, may be, into several weeks, with a doubtful prospect of recovery at the end, would be a very serious matter to an artisan or poor clerk; each case must be judged on its own merits; but the surgeon is surely wise who looks at the question from the broad standpoint of a patient's needs and welfare in the future.

5. *Are there any premonitory symptoms which may accurately be described as heralding the approach of sympathetic ophthalmia, and upon the advent of which a surgeon by immediate enucleation, may prevent the onset of the disease?*

Most unfortunately, it is here that our knowledge fails us. I know of no symptoms that can be thus accurately described. The advent of any of the usual clinical signs is sure evidence that the disease is already present. There is some consolation in the fact that if the presence of sympathetic ophthalmia is recognized in its earliest stage, it may often be controlled and a fair recovery obtained, but the very insidious character of its onset may cause the earliest signs to pass unnoticed, unless the patient is at the time under the close supervision of the ophthalmic surgeon, which is often not the case.

TRANSFERRED OPHTHALMITIS: SYMPATHETIC
IRRITATION: SYMPATHETIC OPHTHALMIA.III.—CHARLES A. OLIVER, A.M., M.D.,
PHILADELPHIA.

For several years past I have taught my classes and private students that so-called "sympathetic irritation" and sympathetic ophthalmia" are simply different stages of a condition which I have preferably termed "transferred ophthalmitis." I believe that the expression "sympathetic," as ordinarily understood in this connection, has no significance and bearing whatever, and I am certain that the term "irritation" is just as false; I am also sure that it must be applied to any form of inflammation of the interior of the eyeball. The word "transferred" is correct, no matter what the process may be, and the generic term "ophthalmitis" is both adequate and comprehensive.

Not desiring, in such a broad discussion as this, to enter into the many interesting questions of a direct and indirect cause and effect, such as nature of offensive agent, character of wound, injury, or primary inflammation, position of chief local disturbance, introduction of aerobic and non-aerobic germ-life into the organ, degree and kind of blood and lymphatic reaction, presence of dyscrasic material in the vascular canals and lymph channels, condition and freedom of lymph spaces, etc., I shall limit my remarks to the one most important clinical finding which I was fortunate enough to obtain from a personally-prepared study of the relative prevalence of the disease as seen in the practice of Will's Hospital in my own city during a period of over seventy years. To get these results I have spent much time, in association with three of my assistants,¹ in carefully collating everything possible upon the subject from the many records at the institution. Some quite interesting data upon the condition at large I shall reserve for a later and more extended communication.

Without entering into a tiresome, time-taking, and really useless exhibit of the tables obtained, the one great finding ascertained was as follows: Since the common and routine employment of x-ray study, and improved methods for the removal of foreign bodies from the interior of the eyeball, the introduction of newer and better forms of treatment of variously injured eyes, and the greater hygienic precautions now offered workmen and laborers in dangerous position in and around Phila-

¹Drs. S. Rush Ketcham, Albert J. Britt and I. Louise Haverstick.

delphia, the number of recorded instances of the conditions² has been, in spite of a vast increase of cases which are ordinarily supposed to be provocative of it (some 62 per cent.), actually reduced nearly 80 per cent. of the former proportionate amounts, both singly and combinedly in decade periods, within the past ten years. This is a most remarkable betterment, and one which is worthy of individual record.

SYMPATHETIC DEGENERATION.

BY A. FREELAND FERGUS, M. D., F.F.P.S., F.R.S.E.,

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In the following communication I desire to bring before the members of the Section an ophthalmic condition to which I have provisionally given the name of "sympathetic degeneration," in order to distinguish it from that serious inflammatory disease known as "sympathetic ophthalmia or ophthalmitis." There can be little doubt that the latter, like all other inflammatory diseases, will ultimately prove to be associated with micro-organic life; and to my mind the balance of evidence seems to point to sympathetic ophthalmitis being due to a specific and definite micro-organism which has till now escaped detection. Should a parasite be discovered and should the etiology of this disease thus become clear, then biological pathology may give us a method of robbing ophthalmic practice of one of its greatest terrors. Unlike sympathetic ophthalmitis, the condition to which I think the name of "sympathetic degeneration" may tentatively be given is non-inflammatory; moreover, there is this vital difference—that, so far as I have observed, it does not lead to blindness.

Its chief characteristic is a peripheral and, as a rule, a tolerable concentric contraction of the field of vision. Some years ago I commenced to make systematic perimetric investigations in all cases in which one eye was seriously injured. The hyperæmia of the optic disc and the retinal asthenopia in the sympathizing eye, which generally precede an attack of sympathetic ophthalmitis, led me to hope that perimetric examinations might give timely warning of a possible onset of the malady, and thus avert disaster. A few of the results of these early investigations were given in a paper which I had the honor to place before this

²Necessarily even greater at present than formerly, by reason of more careful examinations made by those whose life-work is limited to the study of eye diseases alone.

Section at the meeting of the Association at Ipswich, and this communication may be considered simply as a continuation of that preliminary note.

The present paper deals with twelve cases, all seen at the Glasgow Eye Infirmary; ten of these were observed in 1905 and the other two in 1906. Notes of many more cases observed during the same period are included in my book, but time will not allow of my discussing more than the twelve already mentioned, which are taken almost at random from a much larger number. My conviction is that severe injury to one eye is generally followed by a certain amount of sympathetic degeneration ensuing in the other.

Of the twelve cases included in this series the right eye was injured six times and the left also six times. With one exception all the patients were males.

The first case to be mentioned is that of a riveter whose left eye was found to be sightless. There was old-standing iritis and probably cyclitis, the posterior synechiæ being complete. The visual acuteness of the remaining eye without any correction was $\frac{2}{3}$ of Snellen's scale. The tension of the injured eye was high, but yielded to treatment. Notwithstanding the great contraction of the field of vision, this man had been able to work at his usual employment as a riveter during the twelve years that had elapsed since the injury to his eye was received.

The second case is of a man aged 50, whose left eye was injured about thirteen years before the time at which I saw him. This eye presents an atrophic stump, and there is a cicatrix in the upper part of the ciliary region. The injured organ is probably reduced to about one-third of its natural size. The visual acuteness of the uninjured eye is $\frac{2}{3}$ of Snellen's scale, without any correction. Examination by the direct method reveals the presence of about two diopters of hypermetropia. With spherical +14 he has J. 1 quite easily.

The third case is of special interest, for it shows the contraction in its most exaggerated form. Patient was a coal miner, aged 60. On or about May 27th, 1905, he received a blow on the left eye with a piece of coal. Shortly after the injury he was admitted to the wards of the Eye Infirmary, where he continued for fully five weeks suffering from ulceration of the cornea due to trauma. The ulcer gradually healed and left a dense leucoma. He was examined by me on September 15th, 1905, and again on May 8th, 1906, and on both occasions the field of vision was

found to be as indicated in the diagram shown. The visual acuteness of the injured eye was $1/3$ of Snellen's scale, and was not improved by glasses.

The fourth case is that of a coachman, aged 35, whose left eye was injured by a blow from a poker. He was at once admitted to the Eye Infirmary, where it was found that the left eye was very badly contused and the ball ruptured. As there was no hope of saving any useful sight, enucleation was performed, and thus the eye was removed within four days after the injury was received. The vision in the remaining eye is $6/9$ not improved by glasses. It is to be noted that although the injured eye was removed so early as the fourth day from that on which the injury was sustained, still the field of vision has contracted.

The fifth case is again one of a riveter. The injury to the left eye was received seven years before he came under my notice—that is, when the patient was about 14 years of age. The vision of the remaining eye is $6/6$ of Snellen.

The sixth case is a patient aged 49, who was seen by me at the Eye Infirmary on January 16th of this year. On September 19th, he received a burn on the left eye, which led to the destruction of the cornea and ankylosymbblepharon. The field of vision of the other eye is much contracted, but its visual acuteness without any correction is $6/6$ of Snellen's scale.

In the seventh case the right eye is the injured one. The field of vision of the left eye is not very much contracted, and its visual acuteness is $6/12$.

The eighth case is one in which the sight of the right eye had been lost from injury sustained four years before the time at which I was consulted. On examination I found that there was a very large ciliary staphyloma of the right eye. The left had a visual acuteness of $20/200$; not improved by glasses.

The ninth case is the only one in which I have a record of the condition occurring in a woman. I do not think that the female enjoys any greater immunity from it than does the male, but in a large manufacturing city like Glasgow the vast majority of accidents and injuries occur in the engineering shops or shipbuilding yards, and consequently women are much less liable to them than men. In this case the right eye was lost by accident about eighteen years before I saw her. The left eye was $20/40$ of Snellen's scale. The contraction of the field of vision is chiefly at the outer side.

The tenth case is that of a boilermaker, aged, at the time of my examination, about 35. His right eye was injured seventeen years previously, when he was serving his apprenticeship, by a chip of metal. I found on examination that there was a dense white cicatrix of the cornea to which the iris adhered. The sight in the injured eye was perception of light, but the eye was of about normal dimensions. The vision of the left was 6/12 of Snellen's scale. The field of vision is much contracted, especially at the outer side. It is interesting to note that, notwithstanding his maimed condition, he suffered no inconvenience at his work as a boiler maker all those seventeen years. His sole reason for consulting at the Eye Infirmary was to find out if by an operation any sight could be restored to the injured organ.

The eleventh case is that of a man aged 55. Eighteen years before, the right eye was injured by a piece of metal, and two years thereafter—that is to say, sixteen years before he consulted me—the injured eye was removed. The vision of the remaining eye is also 6/12 Snellen without any correction. The contraction of the field of vision is chiefly at the outer side, although it is also pretty considerable at the upper aspect.

The last case is one of the most typical. In the year 1888 the right eye was injured by a piece of steel, and on inspection a cicatrix is found which runs right down the cornea very nearly throughout its entire extent, and is also prolonged into the ciliary region. For that injury he was treated at the Glasgow Eye Infirmary at the time he sustained it, and he returned to the hospital after the lapse of seventeen or eighteen years on account of a catarrhal condition affecting the injured eye. On examination he was found to have the ordinary form of conjunctivitis due to the bacillus of Weeks, a condition in no way connected with the previous injury. There is not the slightest trace in the uninjured organ of sympathetic ophthalmitis, of iritis, or of cyclitis.

Here I would remark incidentally that on more than one occasion I have found bacteriological investigation to be of great use in helping me to come to an opinion as to the advisability of enucleation.

Take, for example, a man with an injured eye; supposing he turned up in the consulting room with lacrimation and the general symptoms of a slight catarrh. It is found to be of the first importance to make a bacteriological investigation so as definitely

to determine whether the condition is or is not due to the presence of some of the well-known conjunctival micro-organisms. Again and again I have found this investigation to have a most important bearing on the treatment of the case.

These briefly are the facts which I wish to bring before the members of this Section. As already stated it seems to me that there are few cases in which one eye is damaged where there is not some degree of impairment in the other, totally distinct from sympathetic ophthalmitis or even from the well known sympathetic irritation. The chief indication of the changes to which I refer is the contraction of the field of vision; but in quite a considerable number of the cases there are also to be found other signs. Thus not infrequently we find coincident with the setting in of the contraction of the field of vision, a lowering of the visual acuteness.

In the 12 cases which I have here recorded only 2 had the full visual acuteness of Snellen. In the others it was found impossible to bring up their vision to the standard. Sometimes we find that a patient when first observed has a normal visual acuteness as well as a full field of vision; but as days pass on the field becomes contracted, and along with this there is very frequently a lowering of the acuteness of vision. Furthermore, in one or two cases other disturbances have been observed. I remember 3 at least in which the patient suffered severe neuralgic pains both on the side of the injured eye and on that of the healthy one. In 2 of these cases the extreme pain was by no means assuaged by the enucleation of the injured organ. This is a rare condition, but when present it is apt to be very severe. In one case I remember the severity of the pain kept the patient from sleep and rendered him quite unfit for work for a period of some months. This patient had received a blow from a piece of coal on the right eye, and panophthalmitis set in. The eye was safely enucleated; but notwithstanding he took the severe supraorbital pain, which rendered him quite unfit for the duties of life for a considerable time.

The occasions on which I have noticed the severe neuralgia have not been sufficiently numerous to enable me to draw any conclusion as to its causation. There can, however, be no doubt of the fact that it is often present in a marked degree.